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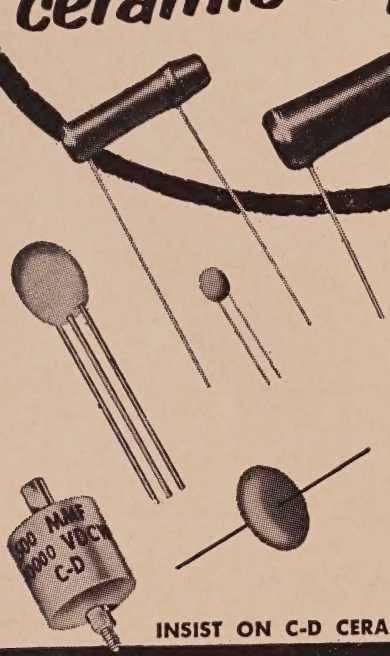

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SPECIAL-PURPOSE TRANSISTOR CIRCUITS

While concentrating on the eventual, wholesale application of transistors to radio and television receivers, electronic computers, and other present multi-tube systems, many technicians miss the fact that transistors may be used now in numerous practical devices. In taking the place of tubes in these devices, the transistor permits smaller over-all size, lower power drain, and often makes battery operation economical.

The various transistor circuits described in this article will suit certain special purposes. However, each operates well in conjunction with other apparatus and systems and, where feasible and desired, may be combined with other pieces of electronic equipment.

Transistorized Relays

Relay sensitivity may be increased by means of a transistor-type amplifier. The transistor amplifier can be made quite small, often tiny enough to be mounted directly on the base of the relay. In some installations where there is considerable vibration or mechanical shock, the transistor amplifier might actually be preferred to a tube circuit because of the mechanical ruggedness of the transistor and its freedom from microphonics.

Basic Relay Circuits. Figure 1 shows the basic arrangements for practical transistorized relays. There are numerous variations of these schemes. In each case, the junction-type transistor and battery comprise a simple d-c amplifier. The battery and signal-input polarities are correct, as shown, for pnp transistors but both would be reversed for npn types. NPN transistors give equal performance but are somewhat higher priced. In each circuit, the d-c resistance of the milliampere-type relay must be as low as practicable in order to realize as much as possible of the short-circuit current amplification of the transistor. The common-emitter transistor connection is employed in each instance.

In Figure 1(A), the low-resistance d-c relay is connected directly in the collector output circuit. The static collector current (i_{eo}) therefore flows through the relay in the absence of a signal. In the case of the junction transistor operated at low d-c collector voltage, however, this current is quite low (a few microamperes in strength) and cannot close the relay. The d-c input signal can be several microamperes, while the collector-current change required to close the relay can be, for example, 1 milliampere.

The current gain provided by the transistor is equal to a/(1-a) where a is the alpha rating of the unit, and will be some figure between 10 and 100, depending upon the type of transistor. Type CK722, for example, will give a gain of 12, while the higher-alpha CK725 will give 90. A 1-milliampere relay operated in conjunction with this latter transistor in the circuit shown in Figure 1(A) would close with a d-c input signal of only 11 microamperes, provided the entire short-circuit current gain could be utilized. The lower-resistance, meter-type d-c relays allow maximum gain to be obtained.

In some instances, it is desired to use a d-c relay of the microampere type. Because of the low current requirement, such a relay is apt to be closed by the static collector current of the transistor before a signal is

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applied. The technique for balancing this "cutoff" current out of the relay is identical with that for zero-setting the indicating meter in a vacuum-tube voltmeter. Figure 1(B) shows such an arrangement. A 4-arm resistance bridge is formed by R_1, R_2, R_3, and the internal collector-to-emitter resistance of the transistor. Under no-signal conditions, this bridge is balanced by adjusting the variable arm, R_3. At balance, no current flows through the relay coil. Under these conditions, $R_3/R_{ce} = R_2/R_1$, where R_{ce} is the internal collector-to-emitter resistance of the transistor. The application of

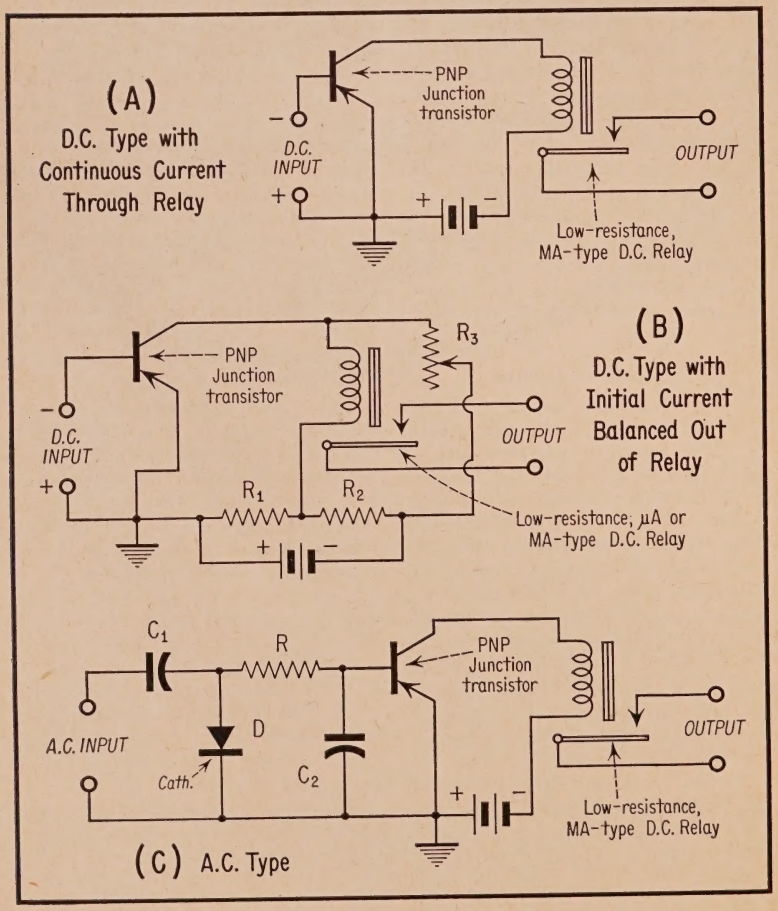


Fig. 1. Basic Transistorized Relays.

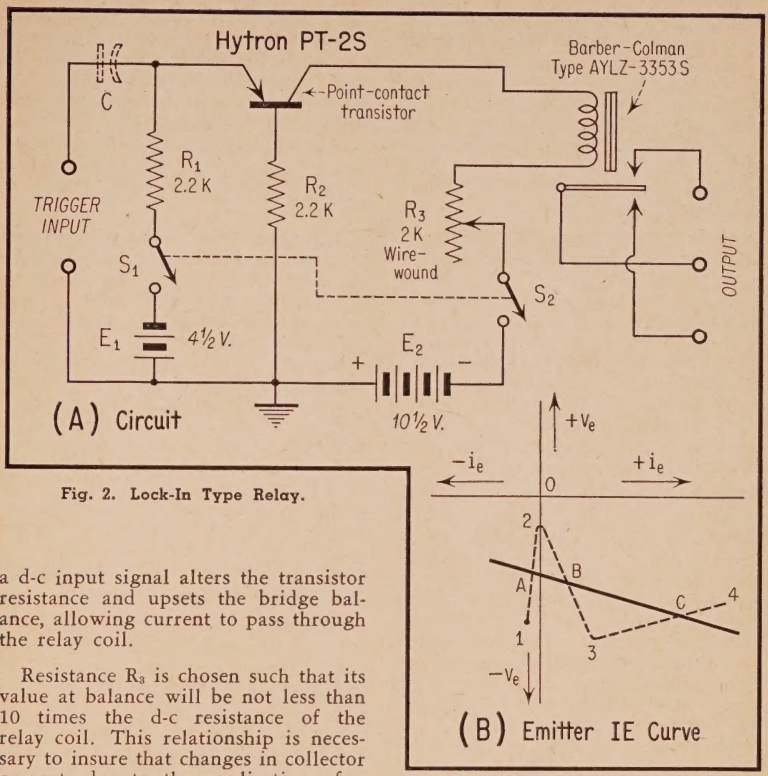


Fig. 2. Lock-In Type Relay.

a d-c input signal alters the transistor resistance and upsets the bridge balance, allowing current to pass through the relay coil.

Resistance R_3 is chosen such that its value at balance will be not less than 10 times the d-c resistance of the relay coil. This relationship is necessary to insure that changes in collector current, due to the application of a signal to the INPUT terminals of the circuit, will flow through the relay coil and not through R_3. Resistances R_1 and R_2 are equal in value and are chosen low enough to allow the highest bleeder current consistent with desired battery economy. For a 2000-ohm, 100-microampere relay operated from a typical pnp junction transistor (e. g., CK721, CK722, 2N34, etc.) and 1½-volt supply, $R_1 = R_2 = 500$ ohms, and $R_3 = 25{,}000$ ohms total.

A small a-c signal may be used to operate the transistor relay by first rectifying the signal with a germanium diode. This scheme, illustrated in Figure 1(C), is satisfactory down to r. m. s. levels of 1 millivolt. This voltage appears to be the rectification threshold of the germanium type of diode.

A shunt diode circuit is employed and consists of input capacitor C_1, diode D, filter resistor R, and filter capacitor C_2. The shunt circuit has the advantage that the circuit under test is not required to complete the d-c path of the diodé.

D-C output, resulting from the applied a-c signal, appears across capacitor C_2 and is applied to the base-

emitter input circuit of the transistor d-c amplifier, as in the preceding examples. Typical values for the diode circuit are: $C_1 = C_2 = 0.1$ ufd. for frequencies under 1000 cycles, or 0.01 ufd. for higher frequencies; R = 1000 ohms. The d-c amplifier portion of the circuit also may be in the form of Figure 1(B) if a microampere-type of relay is to be used.

Lock-In Relay. The negative resistance characteristic of the point-contact transistor is utilized in the circuit shown in Figure 2(A) to obtain a rapid lock-in relay feature. Junction transistors will not operate in this circuit. A triggering pulse applied to the INPUT terminals will result in pull-in of the relay which will then remain closed until a pulse of opposite polarity is applied or the d-c supply voltage is interrupted momentarily.

Operation of this circuit is based upon the S-curve response of the emitter-base input circuit of the point-contact transistor operated with high base resistance, R_2. This curve is shown in Figure 2(B) and results from a combination of the effects of the base resistance and the higher-than-unity current gain of the common-base point-contact transistor. When the emitter current (i_e) is negative, the emitter voltage increases negatively from point 2 to point 1. When the emitter current is positive, however, emitter voltage first increases negatively (from 2 to 3) and then decreases from 3 to 4. Regions 1-2 and 3-4 represent positive resistances, and they are separated by an unstable region of negative resistance, 2-3.

Battery E_1 initially biases the emitter to point A on the curve of Figure 2(B). Point A corresponds to low collector current (200 ua. in the case of the transistor type shown in the circuit). If a positive external signal now is applied to the emitter, the operating point will be shifted in the direction of point 2. If the signal is large enough, the peak point (2) will be exceeded and the operating point will be pulled into the negative resistance region, 2-3. This being an unstable region, operation will transfer to the stable point, C. The circuit thus is bistable at points A and C, and operation will remain at C (corresponding to high collector current — 1.7 ma. in the case of the transistor type shown) until an emitter pulse signal of negative polarity returns it to point A.

With the Type PT-2S point-contact transistor and the operating voltages shown in Figure 2(A), resistances in the emitter, base, and collector legs each should be 2200 ohms. This means that the d-c resistance of the relay coil in the collector leg of the circuit must not exceed this value. Shown in Figure 2(A) is a Barber-Colman Type AYLZ-3353S Micro-positioner type of polarized d-c relay. This relay has an internal resistance of 240 ohms and pulls-in at 1 milli-ampere. The 2200-ohm external collector resistance required in the bistable circuit accordingly must be made up between the relay coil and the external resistance, R_3.

A 3-volt-peak a-c or d-c signal will pick up the relay in this circuit and will lock it in when the signal is positive. The circuit will be "unlocked" and the relay dropped out when the signal is negative. When a-c signals are to be employed exclusively, a 0.1-ufd. coupling capacitor may be connected in series with the high INPUT terminal, as indicated by the dotted symbol in Figure 2(A).

Audio Millivoltmeters

The high voltage gain of the junction transistor at low frequencies can be utilized in the design of simple audio-frequency millivoltmeters for use where high input impedances are not required.

Figure 3(A) gives the circuit of a simple, self-contained instrument which has a basic range of 20 millivolts r. m. s. full-scale. Input resistance of the circuit is approximately

500 ohms. The input signal applied through the 2-ufd. coupling capacitor, C_1, is rectified by the germanium diode, D, and the resulting dc applied with negative polarity to the base of the transistor. The transistor functions as a d-c amplifier to drive the microammeter.

The meter is set to zero initially, in absence of an input signal, by means of rheostat R_4. With a known 20-millivolt r. m. s. input signal at 1000 cycles, rheostat R_5 (CALIBRATION control) is set for exact full-scale deflection of the meter. Response of the meter will be found to be approximately square law, due to the low-signal rectification characteristics of the diode. Higher millivolt ranges may be provided by making a step-type potentiometer ("range switch") of R_1 to have the same total resistance value of 500 ohms. Some adjustment of the individual sections of such a

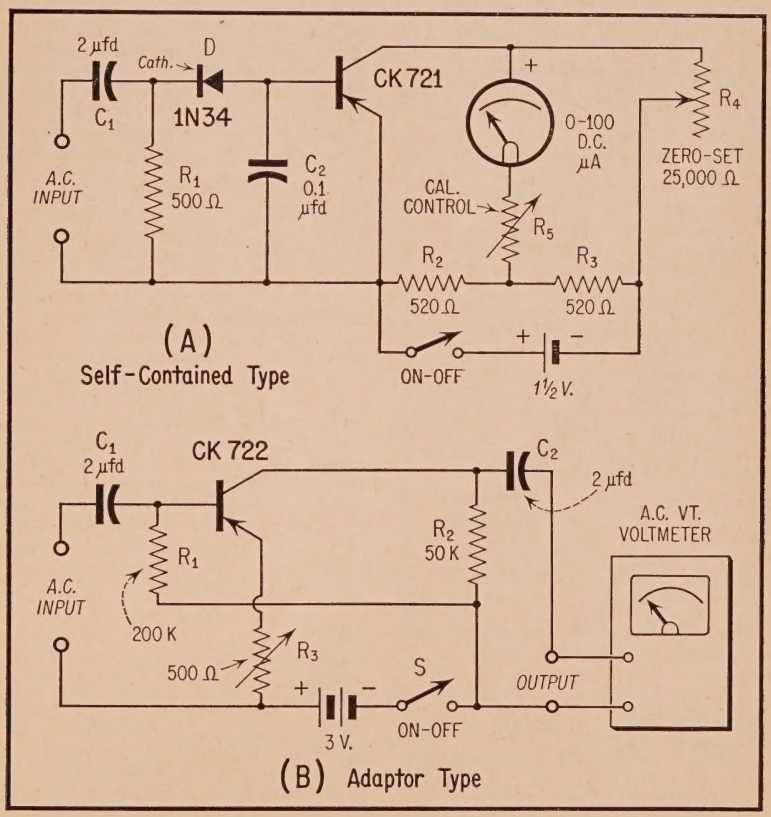


Fig. 3. Audio-Frequency Millivoltmeters.

potentiometer would be required, since the instrument circuit draws current.

Figure 3(B) shows an adaptor-type of millivoltmeter circuit. This arrangement is so called because it is used ordinarily in conjunction with a conventional a-c vacuum-tube voltmeter (set to its lowest-voltage range, say 3 volts). It can be built into a low-signal probe for use with the v-t voltmeter.

This circuit requires no zero-set potentiometer, that function being carried out in the v-t voltmeter. Voltage gain of the transistor amplifier is 100, which means that the 0-3-volt scale of a conventional a-c v-t voltmeter will read 0 to 30 millivolts when the v-t voltmeter is operated

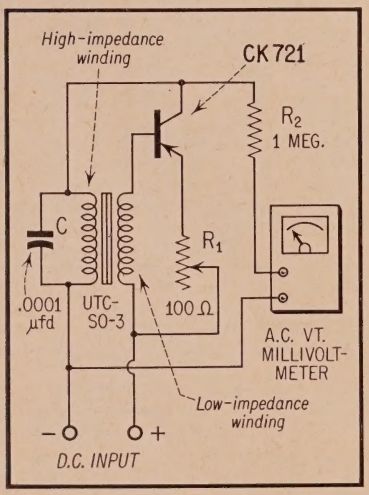


Fig. 4. DC-AC Converter.

from this unit. Frequency response is good to about 20 kc. Input impedance is approximately 1000 ohms.

The maximum signal voltage which may be applied to the INPUT terminals before severe distortion is 0.1 volt r. m. s. The 3 and 10 volt ranges of the v-t voltmeter will suffice for the entire range of small voltages measurable with the aid of the adaptor.

Resistor R_1 may require adjustment to a value other than the 200K shown in Figure 3(B), although it will be close to this value for most CK722 transistors. The optimum resistance is the value which will afford the highest gain with minimum waveform distortion (as viewed with an oscilloscope or distortion meter connected across resistor R_2).

The calibration procedure consists of the following steps: Connect a source of accurately-known 30 millivolts r. m. s. at 1000 cycles to the INPUT terminals, and an a-c vacuum-tube voltmeter, set to its 0-3-volt range, to the OUTPUT terminals. Set the CALIBRATION control, R_3, for exact full-scale deflection of the meter. Response of the circuit is approximately linear, but an individual calibration at as many points as practicable between zero and 100 millivolts will insure highest accuracy.

DC - AC Converter

Instruments frequently are not available for the measurement of small d-c signals. A device which will convert these signals into a-c voltages will enable measurement with an a-c vacuum-tube millivoltmeter. The circuit shown in Figure 4 accomplishes this dc-to-ac conversion by utilizing the ability of the junction transistor to oscillate at low values of d-c bias.

The circuit is that of a simple tickler-feedback audio oscillator. Using the components shown, the operating frequency is approximately 500 cycles. The d-c signal voltage, applied to the DC INPUT terminals, becomes the transistor operating voltage. The a-c output voltage thus is proportional to this applied dc. Resistor R_1 provides emitter degeneration and serves to

stabilize the circuit to some extent against the effects of temperature variation, as well as reducing distortion.

The a-c vacuum-tube voltmeter has high input impedance and is connected across the tuned circuit (capacitor C and the high-impedance winding of the feedback transformer) through the 1-megohm isolating resistor, R_2.

The transistor will oscillate at d-c voltages under 0.1 — 100 millivolts. The a-c output is proportional to the d-c input but does not bear a linear relationship to the latter. An individual calibration accordingly will be required. This is accomplished by feeding a number of known voltages into the DC INPUT terminals, measuring the a-c output voltage with the v-t millivoltmeter, and preparing a plot of a-c output versus d-c input.

Keying Monitor

A variation of the preceding circuit may be employed to monitor the keying of a c-w transmitter. This is shown in Figure 5.

Radio-frequency energy is picked up from the transmitter with the small pickup coil, L, placed in the vicinity of the transmitter tank. This energy is rectified by the high-current germanium diode, 1N56, and the resulting dc applied to the transistor audio oscillator. The oscillator circuit delivers an audio current of approximately 1000 cycles frequency to the headphones each time an r-f pulse is received from the transmitter.

This circuit operates efficiently with very little d-c voltage, with the result that dangerously close coupling to the transmitter is not necessary. The transistor audio oscillator follows fast keying, so the monitor is as effective with semi-automatic keys as with the hand-operated variety.

High-Sensitivity Light Meter

A 2-stage, direct-coupled, d-c transistor amplifier (similar to those described in the first part of this article) is used in conjunction with a self-generating photocell and 0-1 d-c milliammeter to produce a high-sensitivity light meter. Full-scale deflection of the milliammeter is obtained with less than 10 foot candles illumination.

The amplifier (see Figure 6) consists of a low-alpha transistor (CK722) direct-coupled to a high-alpha type (CK721). Collector output current of the first transistor flows directly through the base-emitter input circuit of the second transistor. This scheme removes the need of coupling devices

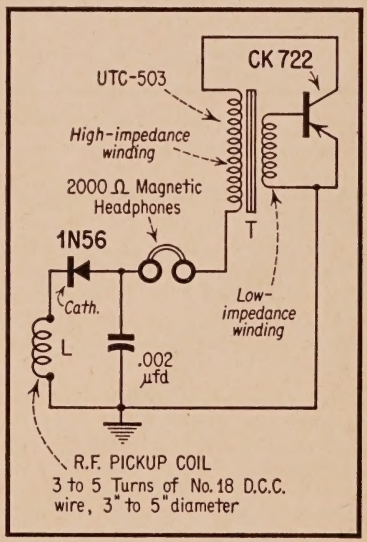


Fig. 5. C.W. Keying Monitor.

and obviates the poor impedance match often resulting from these components. Polarity of the single 1½-volt cell is such that each transistor is biased correctly.

Current from the illuminated photocell flows directly through the base-

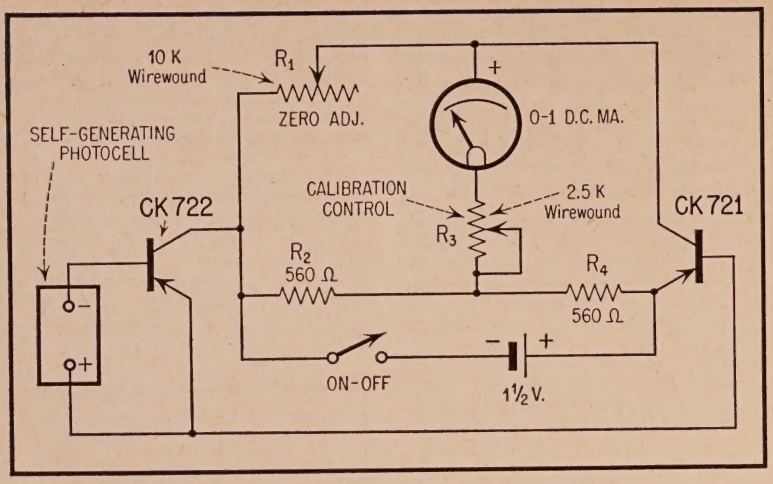


Fig. 6. High-Sensitivity Light Meter.

emitter (input) circuit of the first transistor.

The milliammeter is connected in a 4-arm resistance bridge circuit for zero-setting. The arms of this bridge are R_1, R_2, R_4, and the collector-emitter resistance of the CK721 transistor.

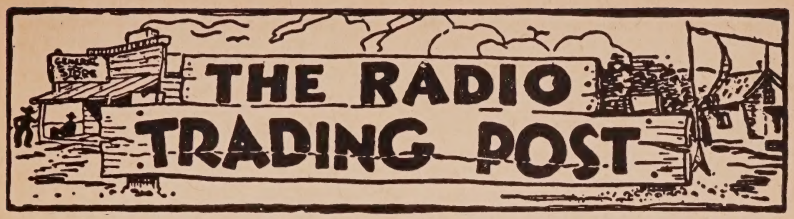
The photocell completely darkened, the meter is set to zero by adjusting rheostat R_1. The cell then is illuminated by a 10 foot-candle light source, and the CALIBRATION control rheostat, R_3, adjusted for full-scale deflection of the milliammeter. The cell then again is darkened, and the meter zero re-set, if necessary. Next, the cell is illuminated again from the 10 foot-candle source, and the calibration control, R_3, readjusted, if necessary, for full-scale deflection of the meter. Alternation between these adjustment steps finally should stabilize both zero and full-scale readings.

Type of Bias Supplies

In each of the circuits described in this article, batteries have been shown for simplicity. In most cases, batteries will be preferred, since the transistor (especially the junction-type) allows economical, efficient use of battery supply. Where desired, however, a-c-type power supplies, embodying suitable transformer-rectifier-filter arrangements, may be employed.

Prior Articles

The following articles in previous issues of the C-D CAPACITOR outline various additional applications of transistors in electronic equipment: **Transistor Circuits,** February, 1950; **Miniature Components for Transistor Circuitry,** November, 1953; **Simple Signal Injectors,** December, 1953; **A Simple Transistor Tester,** May, 1954; and **Transistorized Amateur Field Strength Meter,** October, 1954.



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SWAP — $250 worth of fishing equip., never used, for Jackson sweep and marker generator, includes operating manual. Michael Bux, 1956 East 177th St., Bronx 72, N. Y.

FOR SALE — Complete ham station, fixed and mobile; HQ-129-X receiver, Globe Champion Xmitter with spare coils and tubes, antenna tuner, Hi-Lite 10-meter beam; Babcock D-Xmitter, Morrow 5-band converter, Babcock mobile power supply, cheap. Dick Giese, Withee, Wis.

FOR SALE — Eico model 221 VTVM, in good cond., $15; 3-way portable, $8; radio-phono combination, $18; tubes at 15 cents each. J. Kramer ,229 East 7th St., New York 9, N. Y.

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FOR SALE — Riders TV manuals, good cond., vols. 1 to 7 and 9, $15 each; also have several TVs, need repair, cheap. Want 3 Riders Tech File Coupons. Charles E. Spitz, 1420 South Randolph St., Arlington 4, Va.

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FOR SALE — Two Fischer type 822 transmitting triodes, with plate clips and sockets, used very short time. Lists at $20 each, best offer. L. F. Sander, Jr., 211 Henderson Rd., Pittsburgh 9, Pa.

SELL OR SWAP — Riders manuals, 500 meter direction finder, ATB tuning units 3-9 mc., Gibson Girl, GP-7, and AN-CRT/1 Sonar Xmitters, tubes, prop pitch motor, 16 mm. movie cameras less lens. Want heavy-duty power supply equip. J. P. Carr, 33 Sharp Lane, White Horse, Trenton, N. J.

FOR SALE — Tubes: 304TL, 304TH, 813, and VT127A; sockets and filament transformers; power transformer UTC, 1250 v., 500 MA. W. H. Martin, Fife Rd., RD 2, Bridgeville, Pa.

WANTED — Code equip., including keys, headsets, code oscillator, code records or tape, and associated gear for Scout Troop. Price must be low. L. M. Kline, 5394 63rd St., Maspeth, N. Y.

FOR SALE — Kay Electric calibrated Mega sweep, dual Mega Marker, S. R. and Megaliner; Precision 5" model 500 scope. All like new. Original cost for all $1,200; will take $500. S. T. Hesmer, 812 West Whittier Blvd., Montebello, Calif.

FOR SALE — National NC-125 receiver, l. n., $125. L. J. Schnedorf, 610 Monroe Ave., River Forest, Ill.

FOR SALE — Like new Heathkit VTVM, model V4A, unassembled, $22; kit for 25 w. amp., $10; NRI VTVM with AC head, $25, FOB. A. Palermi, 223 South Winebiddle Ave., Pittsburgh 24, Pa.

SELL OR SWAP — Telescope, 8" mirror mounting, complete with 1/2" eyepiece. Cost $120. Want receiver, tube checker. R. W. Walters, 1544 Court St., Alameda, Calif.

SWAP — Kelvinator KRT61 refrigeration instrument, complete; 3 model airplane motors, for TO-3 Sprague Telohmike, Senior RCA voltohmyst and 1955 model TS3 Heathkit generator kit. Robert A. Heiman, 414 Pierce St., Sioux City, Iowa.

FOR SALE — National NC-100 ASD rcvr., covers all ham bands, all new tubes, in perf. alignment, self-contained power supply (AC), includes external matching spkr., $60. Herman Bartlett, 92 Birch Ave., Little Silver, N. J.

FOR SALE — Harvey-Wells TBS-50C, l. n., with power supply, $90; BC-454B rcvr. (3-6 mc.), $8; Sonar Lo-Pass filter LP-7, $8; Two 4-gang variable cond. worm gear with Venier drive and dial, both $6. S. Egelberg, 3630 Barnes Ave., Bronx 67, N. Y.

SELL OR SWAP — Weston meters (l. n.), 110-220 v., amp. 5, 1,000 w., in fused carrying case, continuity and magnetic buzzer test, $75. Meters list at $100 in kit form. Earl Rubrecht, 4329 Virginia Ave., Cincinnati, Ohio.

SELL OR SWAP — 7 years' complete copies of Proceedings of IRE, from 1948 to 1954. What have you? Arthur W. Pittinger, Lake Intervale, Boonton, N. J.

WANTED — Complete set of Sams Photofacts. Radio & TV Repair, PO Box 12, Union Furnace, Ohio.

WANTED — Western Elec. key telephone system, IA units and 440 or 460 series phones; also want General Industries model D phono motor. James W. Hoskins, 1439 Ohio St., Vallejo, Calif.

FOR SALE — NRI radio and TV servicing lessons, less experiment parts. Best offer. M. L. Chapin, 11684 Coyle, Detroit 27, Mich.

WANTED — Mallory Inductuner and Mallory UHF converter. Buy or have GE 2-volt wet battery portable to swap. Paul Dingwell, Box 206, Woods Hole, Mass.

SELL OR TRADE — 4' by 8' Motorola dealer neon sign; armateur tester; drill press; motor-driven grinder; GI record changer with cutting head. W. R. Whitcomb, Albany, Wis.

WANTED — Stereoscope to view aerial photos. Will pay cash or exchange electronic equip. B. Taylor, PO Box 1, Atlanta 1, Ga.

TRADE — 100 receiving tubes in original boxes; Supreme 592 VOM, $20; coin-operated radios, guaranteed, $14 each; BC-221J freq. meter, l. n., $50. B. Taylor, 1307 Vultee Blvd., Nashville, Tenn.

FOR SALE — Miles-Walkie Recordall, including mike, pick up at 40 feet, leather carrying case, battery operated, but 110 v. power supply may be obtained from mfr. Want $145, FOB. John S. Brill, 146 McAllister St., San Francisco, Calif.

FOR SALE — Bell & Howell sound projectors, models 138, 142, and 156, $100 and up. Lifetime guarantee. Harpster Audio-Visual Equip., Inc., 13902 Euclid Ave., Cleveland 12, Ohio.

WANTED — Old tubes: 00-A and 01-A, must be serviceable. Earnest P. Couch, Jr., 1805 College St., SE, Decatur, Ala.

WILL SWAP — Leroy Lettering set (Keuffel & Esser, cost $125); model 600 Superior portable Multitester; Astatic 510-QT-J arm and cartridge assembly, l. n.; for good pair 7-50 binoculars, and .22 rifle with scope. Walter Williams, 187 Commodore Ave., Tonawanda, N. Y.

POSITION WANTED — Radio repair man with several years experience wishes job with radio repair shop;. Hiram Stamper, Littcarr, Ky.

TRADE — 100 assorted receiving tubes; 400 resistors from 1 ohm to 12 meg. in case. Want musical instrument such as sax or clarinet. J. Earl Munson, Front St., Pembroke, Maine.

WANTED — Pierce wire recorder, model 55B ,model 90 Mike that is made for it, and wire rewinding device made by Pierce. W. E. Walters, PO Box 636, Yucaipa, Calif.

SELL OR TRADE — Special Kodak postcard size camera, 35 mm. roll film still projector, and 16 mm. silent movie comedy films; for good VTVM, TV booster, 2 handy or walkie talkies, or a 4 x 5 press camera. A. Schrier, 38 West 182nd St., Bronx 53, N. Y.

WANTED — Ten No. CK-1091 Raytheon rectifier tubes for Holtzer-Cabot insulation resistance tester, model 10-A. Electric Supply Co. of Galveston, Inc., 2312 Mechanic, Galveston, Tex.

FOR SALE — ARB rcvr., 200 kc. to 9.1 mc., converted for 12 v. DC mobile operation, almost new, complete with 10-foot cables and plugs with control heads, $40. Don Denison, 1201 Townsley Ave., Bakersfield, Calif.

FOR SALE — Meissner FM tuner, model 8C, 8 tubes, walnut cabinet, exc. cond., $20, FOB. Kirk Lumsden, 1103 Arney St., Elizabethton, Tenn.

TRADE — All like new: 3" and 4" meters; tubes, 807W, 811, 813, 100TH, 6J6's, 50c each; Xtmrs 2.5 v. @ 10 A., 3 mfd. @ 4000 v. cond. Need good converter for mobile. John Snow, PO Box 376, Eldorado, Okla.

SWAP — Heathkit TS-2 TV alignment gen., factory calibrated, for VOM, 20,000 ohms per v., or what have you? M. Ruskoski, 18 Orchard St., Pittsburgh 23, Pa.

FOR SALE — Jackson model 109 VTVM, and 112 capacitor checker, Bliley Xtals 2.5 mc., 4.5 mc., 5 mc., 8.55 mc., 10.7 mc., and 16.35 mc., (for CH 5). All like new, make offer. Julius Schwartz, 2370 Euclid Heights Blvd., Cleveland Heights, Ohio.

WANTED — Tapes and key for TG-34-A; phone and code mobile and fixed station equip., for novice amateur. Will pay cash or trade diathermy and test equip. Ira Kamen, 200 Bennett Ave., New York 40, N. Y.

FOR SALE — Like new Johnson Viking II and VFO, also electronic flash kit, not wired. Russell Spera, 37 - 10 33rd St., Long Island City, N. Y.

FOR SALE — Professional disc recorder with lathe cutter; studio lights; electronic flash gun; 16 mm. silent projector; power pack; portable mechanical phono; two phono motors with turntables; code machine with tapes; collection of relays. Samuel Harelick, 27 East 39th St., Bayonne, N. J.

SELL OR TRADE — Eastman model "B" 16 mm. camera, Eastman f1.6 coated 16 mm. projection lens with field flattener in precision mount; sound film recording galvanometers. Want RCA Universal Bridge, '36 vintage, or lab and electronic gear. D. R. Canady, Lunn Rd., Strongsville, Ohio.

FOR SALE — Devry 16 mm. sound projector, 30 w. amp., exc. cond., $110, plus express. Ronald Zimpfer, 19 Neptune Pl., Buffalo 3, N. Y.

FOR SALE — Old models in good cond.— Superior sig. gen., RF and AF, 110 kc. to 105 mc., tests condensers, $5 FOB; Radio City, model 306 tube tester, also tests resistors, condensers, $5 FOB. Robert Odell, 502 12th, Tell City, Ind.

FOR SALE — 50 w., 10 meter phone transmitter, power supply, Xtal in nice cabinet, push-to-talk, 3 meters, ant. change over, whip ant., $30; ARC-5 Xmitter, modulator, rcvr., heavy power supply, key, $30. Lowell R. Wilson, 510 West Division St., Noblesville, Ind.

WANTED — Radio Windcharger in good operating cond., quote price first letter. George F. Koenig, Box 234, Dover Plains, N. Y.

WANT — Sams Photofacts, E-200-C sig. gen., technical books. Have National booster, 1. n.; Sprague Quik-Test, pocket books, tubes and parts. Charles TV, 15 West 24th St., Bayonne, N. J.

WANTED — Operating instruction and/or schematics for RCP Multitester model 663; also schematics for aircraft rcvr., BC-946-B. Cash or trade. Howard B. Furman, 1046 Park Ave., Schenectady 8, N. Y.

FOR SALE — Polar relays WE255A, 1. n., $8.50; Harvey-Wells TBS-50A, exc. cond., $70; model 12 teletype printers, keyboards, sync motors, parts; model 21A printers, $25. Want models 14 and 15 parts. Andrew G. Stavros, 116-32 132nd St., South Ozone Park 20, N. Y.

SELL OR TRADE — Brush "Sound-mirror" model BK-428, mah. cabinet, crystal mike, full mfr's warranty and registration card included, $145, $20 down, balance COD, or trade for test equip. Henry Cox, Pulaski, Pa.

FOR SALE — 16 Sams binders, 1. n., $1 each, COD. Holden TV Service, 814 Richey, Pasadena, Tex.

WANTED — Automatic key (Bug). State price and cond., prefer New Jersey area. John Gubernard, 21 Arverne Terr., Irvington 11, N. J.

FOR SALE — Lear Omni $450: LR-5B VHF rcvr., omniscope, LCP-5 omnipack, RT-10D VHF transmitter, VCIX cross pointer indicator, VCA-2 VAR adapter, Xmitting antenna, junction box, all wiring and switches, etc. Ed Mort, 4863 Winifred St., Wayne, Mich.

WANT — Hallicrafter rcvr., S-38C, or Heath AR-2, in good working order. Would consider other SW receiving equip., if cond. and price are fair. Prefer local contact. Robert Koslovsky, 4045 Wilmington Rd., South Euclid 21, Ohio.

SELL OR TRADE — Dumont 208 scope, thoroughly reconditioned, with GR binding posts, $45, or trade for smaller 3" scope; Heath AC voltmeter, modified to latest circuitry and calibrated to lab. standards, $27. John R. Owen, 6063 Selma Ave., Hollywood 28, Calif.

SELL OR TRADE — Silvertone portable wire recorder and record player, complete with built-in amp., rated at 5 w., crystal mike, 1 spool wire, A-1 cond., $50 or trade for Superior TV-11 tube tester or similar. I. W. Stubblebine, 140 South 4th St., Reading, Pa.

FOR SALE — Emerson 602 FM radio, never used. Sacrifice for $10. G. H. Doty, 1036 So. Broadway, Dayton 8, Ohio.

WANTED — 12" speaker, or 8" coaxial, no defects. Cash or Proceedings of IRE, Sept. '47 to Aug., '50. R. Landauer, 16 Muldowney Circle, Poughkeepsie, N. Y.

SELL OR TRADE — Majestic Super "B" current supply; Bristol power amplifier; 3 Western Elec. 216A tubes; Timmons power amp., and B supply; Jewell voltmeters. Want scope or sig. tracer. J. A. DeFonso, 624 Reynolds St., New Castle, Pa.

WANT — SX-28, HQ-140, or equivalent; 10-meter mobile Xmitter; PE-103; Gonset 2-meter and Tri-Band converters, or equivalent. Send for list of trades. Walt Zmetronak, 147 Farview Ave., Paramus, N. J.

WANTED — RCA 170-A audio chanalyst. State cond. and price. Ed Scribner, Schoharie, N. Y.

SELL OR SWAP — BC-275, 12 v. Xmitter, complete with 115 v. AC power supply, tuning units for 80 and 40 meters, power and control cables with plugs, T-17 mike, ready to go on the air. $69.50 or trade for equal value. A. W. McAuly, 730 Herron Ave., Verona, Pa.

SELLING OUT — Blackhawk Radio and TV Shop in Waterloo, Iowa. Good stock of tubes, parts and equip., same location years, cheap rent. If interested write to Mrs. B. I. McDonald, 2912 Rainbow Dr., Cedar Falls, Iowa.

FOR SALE — 4 University PH speakers with MA-25 driver units; 2 RCA MI-12214E P.P. Par. 6L6, 50 w. amps. All in good cond., no reasonable offer refused. Thomas R. Dunn, 745 Main St., South Portland, Me.

FOR SALE — Army Signal Corps BC-221 crystal controlled oscillator, orig. form, battery driven, wooden case, exc. cond. with orig. calibration book. Best offer. F. C. Paddison, 8316 Woodhaven Blvd., Bethesda, Md.

SELL OR SWAP — Meissner 8C FM tuner; Heathkit TS-3 TV sweep gen., completely wired with test leads and instruction book. Both in A-1 cond. Jack Bowdoin, ET3, USS Timmerman EAG-152, FPO, New York, N. Y.

FOR SALE — Precision E-200, $35; RCA 100 w. Isolation transformer, $9; complete '53 CREI TV-FM course, $24. All exc. cond. Fred's Radio Service, Boyer, W. Va.

TRADE — DeForest's Training Electronic Home Laboratory kit, complete with instructions. Want O gauge electric trains and equip. H. M. Denison, 21 South 4th St., Columbia, Pa.

SELL OR TRADE — National NC-57M ex., $40; Meissner M9 2-stage preselector, $25, or trade for camera. A. Haftel, 221 - 04 67th Ave., Bayside, L. I., N. Y.

WANTED — Tape recorder, Heathkit test equip., or kits, amateur and aircraft VHF equip., 8 mm. movie films, particularly arts and comedies, good transmitting mike. Will pay cash or trade. Wood Radio and TV, RD 2, Sharon Hill Manor, Coraopolis, Pa.

FOR SALE — 150 mc. FTR standard mobile receivers, never used, tubes, instruction book and schematic; Sams Xtals and vibrator, $10. Joe Kalish, 415 Luhmann Dr., New Milford, N. J.

FOR SALE — Riders TV manuals 1-10, all or part; RCA 630 t.s., exc. cond.; 12" Capehart. Will swap for test equip. Box 183, Dublin, Pa.

TRADE — Argus C-3, with 5 Walz filters, f3.5 Tele-Hagan telescopic lens; Sekonic L II exposure meter in leather case, with flash attachment, exc. cond. Want Precision E-400, Sams, test equip. R. A. Brown, CSC, USS Picking DD685, c-o FPO, New York, N. Y.

FOR SALE — 3 GE dynamotors, l. n., 6 v. to 420 v. at 280 MA, $10 each; Precision model 912 tube tester; Eicor 6 v. to 600 v. at 170 MA.; and Carter 6 v. to 600 v. at 170 MA, $20 each. Edward G. Kertz, Sr., 7426 Pershing Blvd., Kenosha, Wis.

WANTED — Evinrude Mate, Cub, Ranger, or Ace in running cond., for cash or trade Bud phono oscillator, Ghirardi's Troubleshooter manual, GE 6-tube table radio, rifles. S. S. Lynn, 730 East 93rd St., Brooklyn 36, N. Y.

FOR SALE — Hallicrafters: S-53A receiver, and HT-17 Xmitter, $50 each or $90 for both. Richard Feingold, 4514 Avenue "K", Brooklyn 34, N. Y.

SELL OR SWAP — Hickok 900B volt, amp, wattmeter, complete with case and test leads; Eico tube tester; Anchor 101-75 booster; Century 4x5 camera. Want metal detector or ?? Wm. Barber, 309 Alexander St., Youngstown, Ohio.

WANTED — Wilcox CW3 or CW3-D rcvr., with or without coils for cash or trade ham parts or equip. W. H. Bauer, 119 North Birchwood Ave., Louisville 6, Ky.

WANTED — Four (or less) Western Elec. loudspeakers, type 754A. State cond. and lowest price. B. Bailey, RFD 1, Beech Hill, Concord, N. H.

FOR SALE — Like new SX-71 rcvr., with spare tubes. Prefer local. Richard Ebeling, 33 Randolph Rd., White Plains, N. Y.

SELL OR SWAP — Supreme sig. gen., Sprague Tel-ohm-mike, Sams, CRT tester for cash, good pistol or tape recorder. Rad Radio, 846 Bergen St., Newark 8, N. J.

WANTED — 810's, 806's, 833A's, 813's, 829B's. State lowest price. Jim Campbell, 413 No. 4th Ave. E., Dululth 5, Minn.

SELL OR TRADE — RCA 45 record player with new needle, 125 old type radio tubes, 12½" TV. Need tube tester, VOM, or S-82 rec. John P. McCullen, 3050 Bainbridge Ave, Bronx 67, N. Y.

WANTED — Good FM tuner; will sell German Welta twin lens reflex camera, coated 3.5 lenses, coupled focusing flash synchronized shutter, complete with case, unused $20 cash. Walter Baer, 247 E. Frederick St., Lancaster, Pa.

WANTED — German make radio rcvr. or test equipment. Will swap equip. or cash. Kenneth Miller, 6552 Northumberland St., Pittsburgh 17, Pa.

FOR SALE — Eico 360 sweep gen., good cond., $25. Kenneth Loveland, 7614 Manhattan Ave., Parma 29, Ohio.

WANT — 3 Norelco projection units; have to trade Mallory 28 v. DC at 15 amps power supply (115 v. input) lists over $300, or Geiger counter (Victoreen) and wire recorder. E. Tate, 6564 Broadway, Cleveland, Ohio.

WANTED — Riders TV manuals. State number, cond., and price. A-1 T-V Service, 1198 Haddon Ave., Camden 3, N. J.

FOR SALE — Webster wire recorder, exc. cond., $45. Sosville Recording Studio, 712 E St., Marysville, Calif.

FOR SALE — Hallicrafter-TV Model 600, complete, consists of chassis, cabinet, knob, and 10" CRT, less operating tubes. Good cond., $15 COD. John Kozma, 3104 Wilkinson Ave., New York 61, N. Y.

FOR SALE — Silicon diodes: ten IN25, four IN21, seven IN21B. Best offer for single or lot. Joseph Jabbour, 20 Woodbine St., Pawtucket, R. I.

WANTED — 8mm Projector. State make, wattage, cond. and price. Maurice H. Schwartzberg, 522 Seeley Rd. Syracuse 3, N. Y.

FOR SALE — Heath scope, l. n., $25; Heath T-2 signal tracer and test speaker, $20; ¼" electric drill, $9; tube caddy, holds tubes and tools, $10. C. W. Chastain, 228 Timber Lane, Memphis 12, Tenn.

WANTED — Cabinet for 21" 630 TV chassis — light colored console type. Prefer one with space for record player and radio. D. C. Harrington, 2508-B 36th St., Los Alamos, N. M.

FOR SALE — Over 50 types obsolete and hard to get radio tubes in original cartons. Sent C.O.D. United Radio, Okawville, Ill.

TRADE — Back issue magazines: Radio Electronics and Technician for 30 Raleigh "903" coupons, each magazine. Selcraft, Box 394, Spring Valley, N. Y.

SWAP OR SELL — 630 type chassis, good cond. and 21AP4 RCA pix tube for ham rcvr. or $100. G. Langfelder, 31-36 41 St., L.I.C. 3, N. Y.

SELL OR TRADE — Riders TV 1; Simpson 381 bridge; Eico 214 VTVM; Heath 5" scope; RCA 151 scope. Lovett's Radio & Key Shop, Newland N. C.

WANTED — 10 or 12" TV in good cond.; 2" or 3" scope; tape recorder. E. G. Bartlett, Atlanta, Mo.

WANT — Manual for McMurdo Silver resistance-Capacitance bridge, model 904. Webb Radio, 106 Greenwich Ave., New York 11, N. Y.

FOR SALE — Dumont model 164 3" scope, Deforest 2" scope, Eico early model scope best offer takes any or all. Ed Tanrath, R 2, Algonquin, Ill.

FOR SALE — Radio Handbook by Coyne, Understanding Radio by Welch and Watson, Radiotron Designer Handbook, 3rd edition, RCA, $1 each. Albert Lord, 9 Chestnut Ave., Saylesville, R. I.

FOR SALE — National HFS rcvr. and power supply, in exc. cond. Make cash offer. E. N. Christner, 313 Crawford St., Middletown, Ohio.

WANTED — Plug-in coil socket (National XC-6C) from SW-3 rcvr. and IRE Proc. Have tubes — 6SN7, 6V6, 6SJ7, etc., 5000 v. mica condensers — .0002, .0004, .001 mfd and other parts. L. Hetchler, 6101 N. 2nd St., Rockford, Ill.

WANTED — Employment in TV or Radio Servicing weekends. Have attended TV Radio School 2 years and have some outside servicing experience. Louis Tenenbaum, 522 Ocean Ave., Brooklyn, N. Y.

WANTED — Late correspondence course in good cond. and complete. Preferably one specializing in communications. Also have selection of guns to swap for communications or test equip. Stephen R. Gamret, 119 Skyview Dr., R. D. 1 Homestead, Pa.

SWAP — For good dynamic hand mike 8 RCA Victor service manuals or will sell for $1 each. Electronic Service, 4918 Beech St., Hammond, Ind.

FOR SALE — Jackson 115 Tube Tester used very little, $35; Philmore 630 type TV chassis, complete with 12" speaker & 16" mask, knobs. In original shipping carton less CRT, $75. A. J. Cindel, 225 Naples Ter., New York 63, N. Y.

SELL OR TRADE — Meissner signal shifter model 9-1090; Sonar FM exciter model XE10; Millen exciter model 90800; 829B JAN. tubes; all l. n. Want Hi Freq. gear. Cloyd's Radio Shop, 454 So. 3rd St., Hamilton, Ohio.

FOR SALE — Heath FM tuner, $15; and AR-2 communications receiver, $20. Both without cases. Gil Sanford, 2145 Belfast, Montgomery, Ala.

WANTED — Used Radio and TV course, TV test instruments, TV manuals, and Photofacts. John Tuesdale, 251 Aultman Ave. NW., Canton 8, Ohio.

SWAP — 6AQ5, 6BJ6, 6BH6, 6AC7, 6AG5, 6J6, 6AK5, 1S5, 6C4, 6SL7GT, 6SG7, 6SK7, 6SH7, for 5U4G, 6V6GT, 6AN8, 6AM8, 12AU7, 1B3GT, 6AS5, 6AS8, 25BK5, 6AU6. Unused cond. boxed, net for net. C. Elgasser, 1920 Fern St., San Diego 2, Calif.

WANTED — Transmitting, receiving, and test equip., particularly FM communications, must be in good cond. Herbert Piller, Brooklyn Polytechnic Institute, Brooklyn, N. Y.

FOR SALE — BC-348-N rcvr., l. n., converted to 115 v. A.C., guaranteed perfect cond., $55 F.O.B. James Trusdle, Rt. 2, Clyde, Ohio.

WANTED — 300 to 350 w. isolation Xformer for 117 v. AC imput, out 117 v. AC at 350 w.; good silent 16mm. movie projector. Will swap or have cash. John Arnold, Box 84, Bluffs, Ill.

TRADE — Hickok 203A VTVM, exc. cond., measures AC/DC volts and current, ohms, capacitance and inductance. Want Precision E200C and $15 cash. Barbara Palmer, 495 174 St., Bronx, N. Y.

FOR SALE — Jerrold Mul-TV Antenna system. Permits simultaneous operation of an unlimited number of TV sets from one antenna. Write for particulars and low price. Soundcraft Products Co., 9 Kelley Sq., Worcester 4, Mass.

FOR SALE — Riders TV Manuals 1 to 8 incl., $80; VTVM — Electronic Designs, Inc., $25; HV Mult. Probe for RCA v. ohmyst, $5; Supreme Radio Diagram Manuals 1 to 9 incl. $5. O. Mastroianni, 132-03 81 St., Ozone Park 17, N. Y.

FOR SALE — Riders Manuals, 1 thru 15, exc. cond., $50. John Dipinto, 47-19 197 St., Flushing 58, N. Y.

FOR SALE — DuMont 7EP4 tube $5; 5BP4 tube $2.50; Heath V-6 VTVM $19. All in perfect cond. Paul Richter, 1446 Webster Ave., Bronx 56, N. Y.

FOR SALE — RCA complete Mobile transmitter, $60; 350 w., 110 v., AC 60 cy. gas driven gen., perf. cond., $85 FOB; 832 and 832-A tubes, $5; 814 @ $4.50. Wanted 2 Triplett 3" meters, 0 to 25 and 0 to 300 mills. Fred Kloepper, 649 W. 23rd St., Lawrence, Kan.

SELL OR SWAP — Three phase trans and rectifier for plating microscope. C. D. Corrio, 185 No. 15th St., Bloomfield N. J.

WANTED — Good VTVM in trade for Ciroflex model B camera, coated f3.5 lens, shutter speed 1/10-1/300, rangefinder viewfinder combined, flash attachment, leather case, Weston Master II meter, l. n. H. Chasen, 343 E. 55th St. Brooklyn 3, N. Y.

FOR SALE — Transformers: UTC S-1, two Thordarsen T-13A35, T19F81; Chokes: two Thordarsen T-13C26; Midget condensers 5 plates and 19 plates; Hammarlund hum control 20 plate APC 75. Best offer for lot. Roger Shaw, Box 802, New Bedford, Mass.

WANTED — Information concerning T.M. manuals, and surplus conversion manuals, BC-624-A, BC-625-A transceiver unit. Cash or swap. H. E. Rossi, 3 Sunset Ave., Matawan, N. J.

FOR SALE — 522 converted, $29; AC pwr supply, $10; scope, $8; Arc 5's, BC191 working, all parts, FM conv.; BC348, BC365, APT5. What do you need? Ernest Weiss, 209 Forest Ave., Lynbrook, L. I., N. Y.

WANTED — Reading lessons for Practical Television Servicing course by Television Communications Institute of Chicago. State price. Harlan Rosenblatt, 125 S. 69 St., Omaha 3, Neb.

FOR SALE — RCA scope WO-56-A $200; Hickok Videometer Model 650, $210. R. Van, 412 Humboldt St., Rochester, N. Y.

WANTED — Early FM rcvr. (for old band), prefer Meissner but Zenith or similar high-gain chassis OK. Have VHF antennae, misc. relays (BC-645 type) and 1206 BC rcvr. for sale. Local sale preferred. Gene Mick, 3133 Teesdale St., Philadelphia 15, Pa.

WANTED — Complete set U.M.S. Parts and Service manuals; model 156-A Hickok Traceometer; RCA stock no. 157 and 9572 Crystal Calibrators. Paul Capito, 637 W. 21st St., Erie, Pa.

SELL OR TRADE — NRI dictionary; NRI TV Ser. 2 texts; 11 TV Ser. manuals, 22 TV Diagrams, Radio and TV parts. Want rec., tubes. Vincent Malack, 10530 Edbrooke Ave., Chicago 28, Ill.

FOR SALE — Model 167-B RCA Test Oscillator; Sutco U.H.F. converter; ATI-Booster. Capp Radio Service, Camp Hill, Mounted Route, Pa.

SELL OR SWAP — CREI TV & FM Servicing course; BC 603 converted to 10 meters external power supply; model GI-R70 disc. recorder; '40 custom Packard car radio. Want condenser checker or tube tester. Ray Williams, 1262 24th Ave., San Francisco 22, Calif.

FOR SALE — NC-98 rcvr., $120; Elmac AF-67 transciter, $145; 2 Vibrapacks 400 v. @ 200 MA., 6 v. and 115 v. primary $15 ea.; 2 meter LW-60 transmitter and power supply, $60. Louis Myrmel, 1105 Kampenga Ave., Muskegon, Mich.

FOR SALE — 16" TV chassis, with or without tubes and unused RCA color Television Home Study course. David Bell, 3917 Ely Ave., Bronx 66, N. Y.

FOR SALE — Collins 70E 8A OSC and National MB-150 all band tank circuit, $80. Mitchel Katz, 147-11 76th Ave., Flushing 67, N. Y.

WANTED — Band switch for 13 tube Wester Air Patrol radio model 1337 new or used must be reasonable. Will pay cash or trade new radio tubes for it. John Simmons, 520½-10th St., Alamosa, Colo.

SELL OR TRADE — Zenith transoceanic 7 Bands AC, DC or battery, $75 or trade for transmitting equip. Bud Sheldon, Box 721, Aberdeen, S. Dak.

TRADE — Two unused Stanwyck, four lead, FM - IF Xformers for late edition of Amateur Call Book, (1953 or 1954). Martin Schachne, 60 Carlton Ave., Brooklyn 5, N. Y.

FOR SALE — Webster-Chicago 78 rpm changer model 56-5, Astatic GC cartridge, new Sapphire needle, four-pole motor, l. n., $15; Heathkit AR-1 rcvr. Very good cond., with tubes, $15. Mike Peterhans, Pond Farm, Guerneville, Calif.

FOR SALE — Heath equipment: TC-2 tube checker $35, SG-8 sig. gen. $25, V-6 VTVM $30, T-3 sig. tracer $30, C-3 condenser checker $25, VT-1 vibrator tester $20. All in best possible cond. Mitchell Curry, Box 90, N.E. 4th St., Milford, Del.

SWAP — A.T.R. 6 v. and 12 v. batt. eliminator, or Gonset Tri band, for pair of 10 or 12x50 binoculars. Jerome D. Lasher, 46 Hawthorne Ave. Hamburg, N. Y.

WANTED — Scotch recording tape, AM-FM radio in good cond.; VOM meter; Hi-Fi equip.; Chevrolet radio 1954 model. J. T. Wentworth, 4269 Packingham Dr., Springhill, Ala.

FOR SALE — SX28A Hallicrafter rcvr. with matching speaker, $150. John J. Ludwinski, Box 281, Florida, N. Y.

FOR SALE — Riders Manuals 1 to 5 abridged, 6 through 17 and 19, $140. Send check or money order. Books shipped post paid. Charles C. Case, Box 122, Calistoga, Calif.

WANTED — 152-162 FM used set. H. Kuell, 18½ Thomas, Newark 5, N. J.

FOR SALE — National Navy rack type, RAS-2 HRO, incl. 8" speaker, power supply, coil compartment and manual, 7 coils, tunes 190 kc.-30 mc. continuous. No Bandspread, Xtal or S-meter, exc. cond., $90 or best offer. F. R. Fraser, 2288 Seminole, Springfield, Ohio.

FOR SALE — Ultra-Audio tape transport mechanism: dual track Shure 815 head, two speed, up to 7" reels, exc. cond. with instruction book, schematics, only $35. Brad Lentz, 710 E. Virginia, Peoria, Ill.

FOR SALE — Neon sign — Radio Service — 4" letters, for inside or outside hanging. Complete with Xformer, A-1 shape, $20, delivered prepaid. Bill Miglin, 1925 E. Jackson St., Springfield, Ill.

WANTED — Any H. Sams Folders 185 and up; Resistor cabinets with or without resistor. Will pay cash. Gregory Swiska, 109 E. School St., Woonsocket, R. I.

FOR SALE — 2 Policealarm FM rcvrs., PR-31 30-50 mc. and PR-9 152-174 mc., $40 each; Philco RF gen., 100 kc., 110 mc., 6 bands, model 7070, $30; ECA sweep gen., FM and TV, 2-227 mc., $30. Carl C. Seidler, 2854 West 29th St., Brooklyn 24, N. Y.

FOR SALE — R.C.P. tube tester, model 322, eight years old, included nine pen test socket, picture tube test adapter, $15. Wm. R. Holleran, 5515 Ollie St., Pittsburgh 7, Pa.

TRADE — L. n. Smith-Corona portable typewriter for Eico or Heathkit scope. W. R. Boone, 125 Spears Ave., Asheville, N. C.

SELL OR TRADE — Zenith transoceanic and batteries, perfect, $90. Also Kodak E dry mounting press, flytying and fishing equipment, chemicals and laboratory supplies. Want good Hi-Fi equip., guns, knives, or what have you? Gary Gottlieb, Cambridge School, Weston 93, Mass.

SWAP — Radio, TV parts manuals, diagrams, etc. Want used U. S. stamps or what have you? Vincent Malack, 10530 Edbrooke Ave., Chicago 28, Ill.

WILL SWAP — NRI multitester, NRI radio rcvr; RCA and Philco auto radios, Audels TV service manual; 18th edition Radio Master for Sams Photofact manuals 4-5-6. Ray Arendt, 207 E. Amherst St., Buffalo 14, N. Y.

WANTED — A good used oscilloscope. Haywood Radio Shop, Earl G. Sypult, Haywood, W. Va.

FOR SALE — NRI radio TV service course $10. Local area. E. Peterson, 2135 Crotona Ave., Bronx 57, N. Y.

FOR SALE — All-band, 25-watt phone-CW transmitter, clamp modulator, all coils included, 15x7x3" chassis, perf. working order, Pi-Network output, $25 with all tubes and spares. Karl Thurber, 1610 Metropolitan Ave., New York 62, N. Y.

TRADE — A Heathkit TV alignment gen. and transvision field strength meter for regulated 6 and 12 v. power supply with v. and amp. meters. Swap other instruments. Virgil Franceschini, 708 Bigler Ave., Barnesboro, Pa.

FOR SALE — Chevrolet model 985255, instrument panel tuning control, complete with speaker, bench tested for performance. $10 F.O.B. Paul L. DeWeese, 277 Midland Ave., Findlay, Ohio.

SELL OR TRADE — BC Command Xmitter and rcvr.; Millen VFO; electronic multitester kit; radar calibrator. Lew Saunders, 229 W. Burnham, Battle Creek, Mich.

TRADE — 3 TV Video boosters model SP6, never used, for portable or regular typewritter Underwood or Royal prefered. Must be in good cond. R. G. Prunier, 67 Lafayette St., Plattsburg, N. Y.

FOR SALE — Simpson 480 Genescope, practically new, $275; Sams Photofact Vols. 1 thru 19, in binders, $200; misc. test equip. quitting service business. Sam Golish, 3830 South St., Louis Ave., Tulsa 5, Okla.

FOR SALE — Mallory 6VTI vibrator tester, $25; CDA 5 decade box, $2.50; 460 approved electronics field strength meter, $50. Postage paid. Robert Coffelt, 1414 Iron St., Bellingham, Wash.

POSITION WANTED — Radio-TV serviceman, 13 years experience desires part-time employment in Elgin area. Bill Davis, 316 Center St., Elgin, Ill.

TRADE — New 20 gauge shotgun 3 shot with ajustable choke for good tube tester that will test TV tubes. C. Wojtena, 3930 Towle Ave., Hammond, Ind.

WANTED — Metal type hand-operated printing press, will trade tubes, test gear, and electronic parts. P. E. Ferrina, 4309 Kansas Ave. NW, Washington, D. C.

WANTED — Back copies of "C-D Capacitor": vol. 1 no. 2 for 1937; vol. 1 no. 4 for 1937; vol. 3 no. 2 for 1939. J. J. Simpson, 85-39 152nd St., Jamaica, N. Y.

SELL OR SWAP — E-200-C sig. gen., used very little. Want good custom 1953 Ford radio. Alva Coker, 5163 Barrier Pl., Jackson, Miss.

FOR SALE — Quantity of Clarostat 30-ohm wire wound volume controls with DPST switch. Will sell cheap. Make offer. Leon Buddine, Box 62, Haddon Hgts., N. J.

WANTED — RCA frequency modulator TMV-128-A, motor driven capacitor called Wobulator, now obsolete. Used with test oscillator 167B. Bill Neilson, 525 Sanol St., San Jose', Calif.

FOR SALE — 7" TV Hallicrafter chassis and 12½" TV Emerson. Best offer. H. Bell, 3917 Ely Ave., New York 66, N. Y.

FOR SALE — Portable Webster-Chicago electronic memory wire recorder, model 180, with 10 one-hour reels of wire. List price of recorder — $149.50, wire — $40. Sell all for $49.95. John W. Carr, 12 Heck Ave,, Ocean Grove, N. J.

FOR SALE — GE FM tuner 88 to 108 mc., new condition, ideal for Hi-Fi amplifier, $40. Chas. Schmitz, 4737 Matilda Ave., Bronx 70, N. Y.

FOR SALE — Heath sweep gen. TS-2, $27; Weston analyzer, voltmeter, milliameter, AC voltmeter, ohmeter, all 3" meters, $25. All in l. n. cond. L. I. Chacon, 5122 Swift Road, Sarasota, Fla.

FOR SALE — 2 Sarkes Tarzian con. for UHF, $10 ea. or $20, takes both with UHF yogi thrown-in. Also will sell NRI Xmitter completely equipped for phone. Robert Pack, 513 Tayco St., Menasha, Wis.

FOR SALE — Jackson model 103 dynamic tube tester with latest roll chart, A-1 cond., $35; Manual of Locksmithing McLean latest edition, l. n., $17. Raymond Yahr, 2051 St. Raymond Ave., Bronx 62, N. Y.

FOR SALE — Radio Television Institute course, 63 lessons in good cond. $17.50; Video Handbook by Scheraga & Roche, $3.75; Practical Television Servicing by Coyne Electrical School, $3. D. E. Greathouse, 1920 'S' St., NW, Washington 9, D.C.

FOR SALE — Supreme analyzer model 339, $10; Triplett combination -tube tester and volt ohm meter model 1183-SC army surplus, $15; Riders radio manuals 1, 2, and 4, l. n., $15. Kurt Frede, Warrenville Rd., R.D. 2 Bound Brook, N. J.

FOR SALE — ART-13 Speech amp, l. n. with tubes, $15; Motorola T-69-20A dual vibrator supply rated 340 v. DC, 240 mils, $15; Westinghouse choke 6Hy, 350 MA. cased $4.50. A. Brocato, 699 Idlewild Cir., Birmingham, Ala.

WANT — CQ, all of '45; Jan., '46; QST, Jan., Feb., '23, all '22 and prior; R. 9, all 1933 and prior; Radio, all '35 and prior. Clifford Storch, 5 Winfield Ter., Great Neck, N. Y.

FOR SALE — Simpson 480 Genescope, four-in-one AM marker, FM sweep gen., crystal calibrator and scope. Cost $465, sell for $250. L. n. in original carton. Tom Kane, 1221 Crater Ave., Dover, Ohio.

WANTED — Radio service business in southern community, must be productive, all replies confirmed. Al Sapper, 3349 Fulton, Cleveland, Ohio.

SELL OR SWAP — U.S.T. all electronic sweep gen., with 1-10 mc. crystals, $60; Supreme model 564 lab. scope 0-4.5 mc., $100. Want Hickock 288X, 292X, 610A, RCA-WR39B or C or WR59B or C. Fred E. Saron, 844 E. 13th St., Bklyn 30, N. Y.

WANTED — Navy Training Course manuals for upgrading in Radioman, Radarman, Sonarman, Electronics Technician, etc., rates. Cash or swap. Ed Howell, Box 126, Lumberton, N. C.

FOR SALE — Following guaranteed obsolete battery type tubes: 1D5, 1C7, 1B5, 1F4, 1C6, 19, 30, 132, 34. Swap or trade over 60-16in. transcriptions in exc. cond. M. A. Porter, 1709 N. Larrabee St., Chicago 14, Ill.

FOR SALE — Precision 954P tube and multi-tester, $56.95, E-200-C sig. gen., 53.85; Eico sig. tracer, $14.95; homemade audio oscillator, $10. Slightly used, good cond. Shipping paid in U.S.A. Roy Gillett, 68 Hyde Boulevard, Ballston Spa, N. Y.

FOR SALE — Rider radio trouble shooters manuals, vols. 1, 3 to 8, and 12. Best offer for one or all. Ralph Hyland, Box 672, Center Moriches, L. I., N. Y.

FOR SALE — Precision series 612 tube and battery tester, slightly used, natural maple portable case, reasonable. Joseph A. Giglio, 22 Granite St., Brooklyn 7, N. Y.

SELL — Bud cabineted 80/40 meter 40 w. Xmitter: includes Triplett meter, 6AG7-807, built in antenna tuner, two power supplies. No reasonable offer refused. Lettine 240, tuner, all coils, shielded and bypassed. Dubov, 3100 Brighton 2nd St., Brooklyn 35, N. Y.

WANTED — Communication rcvrs. Old or new rcvrs. in need of repair. Must be repairable. Send full description including asking price. Sam Tomasell, 30 Longcroft Rd., Rochester 9, N. Y.

SELL OR SWAP — Varco receipt machine, l. n.; 36' Alproduco aluminum TV ant. tower, Want good dynamic mike, Scotch recording tape, or cash. Electronic Service, 4918 Beech St., Hammond, Ind.

SWAP — Double B flat upright tuba for Viking II Xmitter. L. E. Fisk, 3217 Hull Ave., Bronx 67, N. Y.

SELL OR TRADE — 60 lbs oil and bakelite transmitting condensors, and wire wound resistors, never used, different sizes, no junk, $0.79 per lb., minimum 3 lbs. Levinson, 928 Hussa St., Linden, N. J.

FOR SALE — Riders manuals vol. 1-20 except vol. 15, $150 f.o.b. Edwin A. Gruneich, Tekamah, Neb.

FOR SALE — Two-way AM base and mobile stations complete; Mobilet, 140 mc. to 160 mc. for C.A.P., slightly used, 6 v. DC and 110 v. AC, list price $350 and $250; broad band rcvr., crystal controlled Xmitter, 6 x 6 x 10". Walter W. Cowhig, 899 Boylston St., Boston, Mass.

SELL OR TRADE — P-103 no base, AVT (RCA) 115 6L6 model 6L6 output w. power supply 6-12 v. included. Want medium Hallicrafter or National or what have you. J. Zambrano, 325 Park, Leonia, N. J.

WANTED — Another Sola CVA model 7202 "Televolt" Xfmr. or other good constant voltage Xfmr. Also Pickering model 132E record compensator. Sell Scott model 110 (converted to model 111) noise suppressor, perfect, $10. James Littig, Kasota, Minn.

SELL OR TRADE — BC-458A Xmitter, BC-455B rcvr. with 115 v. power supply, BC-603D rcvr. Want test equip. or what have you. J. Camm, Box 43, Syosset, N. Y.

FOR SALE — 522 rcvr. and Xmitter, unmodified, $25 each; Hickok 560 tube tester, factory modified for new TV tubes, $40; Weston 772 analyzer, $35. Or swap above toward commercial ham Xmitter. W. Chrusch, 1269 Chestnut St., Roselle, N. J.

WANTED — Triumph 3" scope. Please advise price and cond. George E. Hazen, Mtd. Rt. 7, Ellwood City, Pa.

SELL OR SWAP — Unused Hi-Fi beautifully styled loud speaker enclosure for single cone 15" spk., or two-way system. Employing "Ultraflex" bass principle, ¾" plywood veneer or mahogany, 38" x 26" x 19" deep. Front grill cloth. Want 15" Alte Lansing speaker. Thomas G. Ravesi, 99 Rockridge Rd., Waltham 54, Mass.

FOR SALE — Unused GE sig. gen. Model 200, never used, complete with test probes and operating instructions, $20 includes shipping. John Hartenstein, 1 West 5th Ave., Brooklyn, Baltimore 25, Md.

FOR SALE — UHF converters, never used, in original factory cartons: Regency RC53, $12; 2 Granco LCU, $15. Doty Radio & TV Service, 1036 S. Broadway, Dayton 8, Ohio.

SWAP — Unused 7JP4 CR tube in factory carton. Want sig. gen. or tube checker, what have you? Wm. Heilbrand, 782 South 19th St., Newark 3, N. J.

FOR SALE — Radio TV repair shop in the heart of New York City. Low rent, Reasonable. Ram TV, 356 Columbus Ave., New York, N. Y.

SWAP — 35mm color camera, fast f28 lens, shutter speeds 1 sec. to 250 sec., leather case, for late model TV tube tester in A-1 cond. Harold Wurm, 1015 W. Grant St., Appleton, Wis.

WORK WANTED — Two men with 2½ years' experience in TV sales, service, installations, will locate anywhere in U. S., must have guarantee of steady work. Contact R. E. E., Box 24, Wallaceton, Pa.

FOR SALE — Vibrapack, 6 v. DC input 400 v. DC 100 MA. output, perf. cond., $12.50; ant. tap switch 11PST ceramic base heavy duty spring and contacts $1.35. Gallagher's Service, Boiceville, N. Y.

FOR SALE — Precision signal marker gen. E 200C with Servicing by Substition book. Never used. $60. Frederick S. Sciaraba, 809 Eastgate, North Valley Stream, L. I., N. Y.

FOR SALE — Riders' manuals 7 thru 11, never used, spotless cond., $5 each. Have 85 lesson radio course, make offer. Samuel A. Gornick, 1150 N. La Salle St., Chicago 10, Ill.

SELL — NRI Radio-TV Communication course, $20; McMurdo-Silver 903-903A wavemeter, field strength meter, coils 3500 kc. - 300 mc., $12; Elements Sound Recording, Frayne-Wolfe, $5; Television Engineering, Helt, $4; Recording Reproduction Sound, Read, $3. William Tietz, 1610 Mahan Ave., Bronx 61, N. Y.

FOR SALE — 1 tube GE pre-amp. unused, $8; Radio Amateurs Handbook, never used, $2. Stanley Strangle, Box 6, Trout Creek, Mich.

WANTED — Photoenlarging equipment 35mm to 2¼x2¼ with or without lense. Need 2" or better boat compass. Swap test or ham equip. Osiecki, 2567 50th St., Woodside 77, L. I., N. Y.

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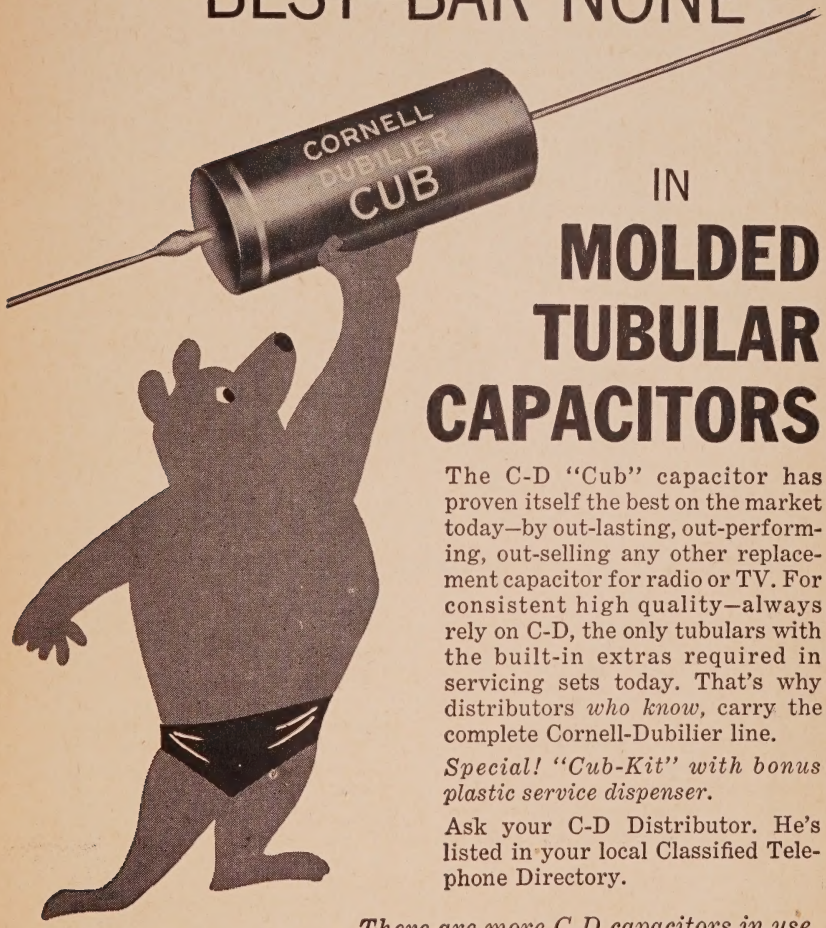

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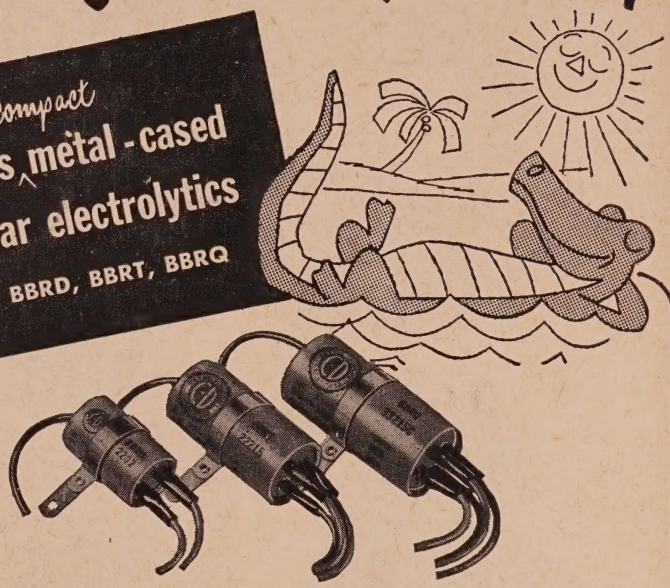

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